

# Facts about Radiation

## What is radiation?

- Radiation is a form of energy that is present all around us.
- There are different types of radiation; some types have more energy than others.
- Radiation released into the environment is measured in units called *curies*.
- The dose of radiation that a person receives is measured in units called *rem*.

## What is radiation exposure?

Radioactive materials give off a form of energy that travels in waves or particles. This energy is called radiation. When a person is exposed to radiation, the energy penetrates the body. For example, when a person has an x-ray, he or she is exposed to radiation.

## How can radiation exposure occur?

People are exposed to small amounts of radiation every day, both from naturally-occurring sources (such as elements in the soil or cosmic rays from the sun), and man-made sources. Man-made sources include some electronic equipment (such as microwave ovens and TV sets), medical sources (such as x-rays, certain diagnostic tests, and treatments), and from nuclear weapons testing.

## How much radiation are people exposed to?

The amount of radiation from natural or man-made sources to which people are normally exposed is usually small. Scientists estimate that the average person in the United States receives a dose of about one-third of a *rem* (or 360 *millirems*) per year. The annual dose to individuals varies, depending on where they live, whether they live in a home with radon in indoor air, whether they had medical x-rays or nuclear medicine procedures in the past year.

About 80% of human exposure comes from natural sources, including radon gas, and the remaining 20% comes from man-made sources – mainly medical x-rays.

**In a radiation emergency** (such as a nuclear power plant accident or a terrorist event) people could be exposed to small or large doses of radiation, depending on the situation.

## Typical radiation exposure (measured in millirems) from different sources —

indoor air radon	200-300 mrems/year
air-food-water	36 per year
chest x-ray	20 per test
the Earth-Atlantic Coast	16 per year
round trip, coast-to-coast plane trip	4 per trip

## What is radioactive contamination?

Radioactive contamination occurs when a radioactive material is deposited on or in an object or a person. Radioactive materials released into the environment can cause air, water, surfaces, soil, plants, buildings, people, or animals to become contaminated. A contaminated person has radioactive materials on or inside the body.

- **External contamination** occurs when radioactive material, in the form of dust, powder, or liquid, comes into contact with a person's skin, hair or clothing. People who are externally contaminated can become internally contaminated if radioactive material gets into their bodies.
- **Internal Contamination** occurs when people swallow or breathe in radioactive materials, or when radioactive materials enter the body through an open wound or are absorbed through the skin.

Some types of radioactive materials stay in the body and are deposited in different body organs. Other types are eliminated from the body in blood, sweat, urine and feces.

## How contamination differs from exposure:

A person *exposed* to radiation is not necessarily *contaminated* with radioactive material.

A person who has been exposed to radiation has had radioactive waves or particles penetrate the body, like having an x-ray. For a person to be contaminated, radioactive materials must be on or inside of his or her body. A contaminated person is exposed to radiation released by the radioactive material on or inside the body. An uncontaminated person can be exposed by being too close to radioactive material or a contaminated person, place, or thing.

## How can I protect myself during a radiation emergency?

The most appropriate actions will depend on the situation. Tune to your local Emergency Alert System radio station or TV station for information and instructions from Vermont health, safety and emergency management authorities. You may be advised to shelter in place, which means to stay in your home or office, or you may be advised to evacuate. These protective actions are designed to prevent or limit your exposure to radiation, and prevent or limit contamination.

Authorities will tell you when and how to shelter in place, take potassium iodide (KI) if you have it, evacuate, where the shelter is located, and in which direction you should travel to avoid the radioactive plume. It is important to follow directions carefully and quickly.

**IMPORTANT:** Wait until you are told to evacuate so that you will know which direction the radioactive cloud (called a plume) is moving and how to avoid it.